Certificate in Big Data Essentials (12 credits)
Training Data Engineers

This certificate program provides essential skills for **data engineers** to design their data infrastructure and apply relevant tools and techniques on their data assets. This includes techniques for data modeling, data integration, efficient manipulation of big data and efficient data pipeline processing.

The curriculum focuses on the technologies behind managing vast amounts of data, writing complex queries on the data and optimizing the performance of database/storage systems to reduce operational costs. Participants will learn how to store, access and analyze Big Data, and how to efficiently extract information from that data to make important financial, business and social decisions. The program consists of 4 courses of 3 credits each, taught over 2 semesters of 15 weeks each. Instruction includes formal lectures as well as hands-on projects involving big datasets and data pipeline processing.

In this program, we make extensive use of software tools such as SQL, MongoDB, Hadoop, Hive, Pig and UML. Students work on assignments and projects covering both theory and applications on real data with guidance from the professor and teaching assistants.

Recommended part-time credit schedule: First semester: 6, Second semester: 6. Total: 12 credits over two semesters (incl. summer).

Core (required) courses:

CS 644	Big Data
CS 636	Data Analytics with R Programming

Sample electives:

Math 661	Applied Statistics
CS 634	Data Mining
CS 670	Artificial Intelligence
CS 675	Machine Learning
CS 732	Advanced Machine Learning
CS 735	High Performance Analytics for Data Science

Credit earned in a Certificate program can be used later towards the MS in Data Science degree.

Program Outcomes:
- Design the infrastructure for managing Big Data in your company in a way that the company needs it to make decisions based on that data.
- Be able to work with the company's software engineers, data analytics teams, data scientists, and data warehouse engineers to aid in the implementation of database requirements, analyze performance, and troubleshoot issues.
- Play an analytical role in performing ad-hoc analyses of data stored in the company databases and write SQL scripts, stored procedures, functions, and views.

Tuition + fees for ALL students (independent of residency and visa status) at 2019-20 rates, assuming two courses per consecutive semester: Fall semester: $6,366. Spring semester: $6,366. Summer semester: $5,421.

Total tuition + fees for Certificate: Fall start: $12,732. Spring start: $11,787. Summer start: $11,787.